Actuarial Report

on the

Manitoba

Municipal Employees

Pension Plan

as at

January 1st, 1989

TURNBULL and TURNBULL

90-04948/

Manitoba

Municipal Employees
Benefits Board

308 - 131 Provencher Blvd.
Winnipeg, Manitoba, CANADA
R2H 0G2

(204) 237-6574
Toll Free: 1-800-432-1908

December 20, 1989

Honourable Jack Penner
Minister of Rural Development
330 Legislative Building
Winnipeg, Manitoba
R3C 0V8

Sir:

I have the honour of presenting to you the Fourth Triennial Actuarial Report on the Manitoba Municipal Employees' Pension Plan as at January 1, 1989.

This Report was prepared by Turnbull and Turnbull, Consulting Actuaries, and indicates that the Pension Plan is in a sound financial position with a surplus of $2,926,085.

The Actuaries have stated in their Report that this surplus may be used in any way considered desirable. In the past, the Board has used available surpluses to provide improvements in benefits. Again, the Board intends to use the surplus to further improve benefits as soon as the costs of various alternatives can be determined.

Respectfully submitted,

G. D. Forrest
Chairman

Minister of
Rural Development

Legislative Building
Winnipeg, Manitoba, CANADA
R3C 0V8

December 22, 1989

His Honour George Johnson
Lieutenant Governor of Manitoba
225 Legislative Building
Winnipeg, Manitoba
R3C 0V8

May It Please Your Honour:

As Minister responsible, I have the privilege of presenting for the information of Your Honour the Fourth Triennial Actuarial Report of the Manitoba Municipal Employees Pension Plan as at January 1, 1989.

Respectfully submitted,

Jack Penner

November 24th, 1989

Chairman and Members of the
Municipal Employees Benefits Board,
Winnipeg, Manitoba.

1. Purpose of Report

This Report presents the results of the actuarial valuation of the Manitoba Municipal Employees Pension Plan (Plan) as at January 1st, 1989.

The purpose of this valuation is to:

(a) determine the financial position of the Plan as at the valuation date,

(b) determine the adequacy of the contributions being paid by the employees and Participating Municipalities, and

(c) provide recommendations as to the future course of action based on the financial position revealed.

2. Source of Information

The information on which the valuation is based included:

(a) A magnetic tape which provided information for each employee as at December 31st, 1988. Details of the information provided included: name, social insurance number, sex, date of birth, date of entry into the Plan, employer code, salary received in 1988, proportion of 1988 worked to obtain the salary reported, required employee contributions to the Pension Part of the Plan and interest on these contributions accumulated to the valuation date and employee contributions to the Disability Part of the Plan with interest accumulated to the valuation date.

(b) A magnetic tape which provided information for each pensioner as at December 31st, 1988. The details of the information provided included: name, social insurance number, sex, date of birth, date of retirement, former employer, type of pension and amount of monthly or annual pension. For each pensioner the portion of the pension charged to the Pension Part of the Plan was also provided. Similar information was provided for each beneficiary.

(c) Information for each former employee entitled to a paid-up pension as at December 31st, 1988. The details of the information provided included: name, social insurance number, sex, date of birth, date of termination, former employer, pension commencement date, monthly paid-up pension amount, and employee contributions plus interest accumulated to the valuation date.

(d) Similar information for each member of the Plan whose status changed at any time during the 3-year period ending December 31st, 1988. The information included the date and nature of the change in status.

(e) A list of those employees who transferred under a reciprocal agreement to another public sector employer, either within or outside Manitoba.

(f) A list providing the names and social insurance numbers of those "special members" who are not participating in the Pension Part of the Plan.

(g) A list of employees who were making payments in 1986, 1987, and 1988 to convert prior service into contributory service. The details of the information provided included: name, social insurance number, employer, service purchased during the year and payment made to purchase this service, period of service which is still eligible to be purchased and the total years of service which have been purchased to date.

(h) A record of general salary increases granted to employees for 1986, 1987 and 1988.

(i) A list of Municipalites participating in the Plan and their employer codes.

(j) The annual reports and financial statements of the Manitoba Municipal Employees Benefits Fund (Fund) for 1986, 1987, and 1988.

We also had available copies of:

(a) the Actuarial Report on the financial position of the Plan, as at January 1st, 1986 (1986 Report), and

(b) the Text of the Plan with amendments to December 31st, 1988.

The data provided as at December 31st, 1988 was reviewed for missing information and illogical information. The data was also compared to the data provided as at December 31st, 1985.

As a result of these procedures, some of the information received was corrected, missing information was located and some persons were reclassified.

The salaries received for service in 1988 were increased to obtain annual salary rates as at January 1st, 1989. This increase was made by assuming that the increases in salaries during 1988 occurred in accordance with the assumptions made for future increases in salaries.

Some employees were members of the Plan for only part of 1988. For these employees the salary received was increased to reflect the salary that would have been received had the employee been a member of the Plan throughout 1988.

3. Membership of the Plan

The information provided indicated that the membership of the Plan was as follows:

	January 1st, 1989	January 1st, 1986
Employees participating in:		
Both Parts of Plan		
- Males	1,218	1,015
- Females	363	274
Pension Part of Plan only		
- Males	394	405
- Females	155	128
Disability Part of Plan only		
- Males	22	34
- Females	-	-
Members receiving pension from Disability Part of the Plan		
- Males	37	30
- Females	2	-
Pensioners		
- Males	247	152
- Females	58	41
- Beneficiaries	41	22
Former employees entitled to paid-up pensions		
- Males	57	16
- Females	21	7
Former employees transferred to another public sector employer within Manitoba		
- Males	19	15
- Females	7	4
Former employees transferred to another public sector employer outside Manitoba		
- Males	3	2
- Females	1	-
	2,645	2,145

The following statistics are applicable to active employees who are members of one or more Parts of the Plan:

	January 1st, 1989			January 1st, 1986		
	Males	Females	Total	Males	Females	Total
Number	1,634	518	2,152	1,454	402	1,856
Average Age	42.91	38.73	41.90	42.96	38.61	42.02
Average Years of Service Since Date of Entry Into Plan	7.63	5.76	7.18	6.71	5.25	6.40
Average Salary Rate	$28,200	$21,800	$26,700	$25,700	$19,200	$24,300

4. Operation of the Plan

A number of amendments have been made to the Plan since January 1st, 1986. Those amendments which had a significant financial effect are described below:

(a) Effective July 1st, 1987, the formula used to calculate the amount of pension was changed. The formula pension is now based on the average of the earnings in the 6 years (previously 7 years) in which these earnings are highest, where these 6 years are obtained from the last 12 years of service.

This change was made applicable to present contributors, former employees entitled to paid-up pensions and present pensioners.

Adoption of this amendment caused an increase in the liabilities of the Plan in respect of service to January 1st, 1986 equal to $1,012,900 as at January 1st, 1986.

This amendment also caused an increase in the theoretical rates of contribution for service after January 1st, 1986. The increases were as follows:

- on C.P.P. portion of earnings	.24%
- on portion of earnings in excess of C.P.P. earnings	.31

(b) Effective July 1st, 1987, there was a decrease in the reduction used to calculate the pension provided on retirement prior to age 60. As a result the reduction is equal to 1/16 of 1% (previously 1/8 of 1%) for each complete month between the date of retirement and the date of attainment of age 60.

This change was made applicable to present contributors, former employees entitled to paid-up pensions, and present pensioners.

Adoption of this amendment caused an increase in the liabilities of the Plan in respect of service to January 1st, 1986 equal to $62,900 as at January 1st, 1986.

This amendment also caused an increase in the theoretical rates of contribution for service after January 1st, 1986. These increases were as follows:

- on C.P.P. portion of earnings	.02%
- on portion of earnings in excess of C.P.P. earnings	.02

(c) Effective January 1st, 1988 the Disability Pension Adjustment Account (Disability Account) was established. This Account was established to finance the pension adjustments granted as a result of increases in the cost of living granted on the portion of the disability pension paid due to potential service.

The Disability Account is credited with:

(i) special transfers to the Disability Account from surpluses generated by the Fund, and

(ii) interest based on the average rates of return obtained on fixed income investments of the Fund during the period reviewed in the latest Actuarial Report on the financial position of the Plan.

The Disability Account is charged each year with the pension adjustments granted to members receiving disability pensions from the Plan. These charges include only the pension adjustments payable on the potential portion of any disability pensions in payment.

An initial transfer of $911,200 was made to the Disability Account as at January 1st, 1988. This amount consists of an allocation of $766,900 from the surplus of the Plan as at January 1st, 1986, plus interest on this amount at the assumed rate of 9.00% per year for 2 years. The amount of the interest was equal to $144,300.

(d) Effective July 1st, 1986, July 1st, 1987, January 1st, 1988 and January 1st, 1989, increases in pensions to offset 50% of the increase in the cost of living during the period from January 1st, 1985 to July 1st, 1988 were granted to all eligible persons in receipt of a pension or entitled to a paid-up pension. These increases in pension were equal to:

Effective Date of the Increase	Percentage of Basic Monthly Pension	Cents Per Month for each Year of Contributory Service (to a maximum of 35 Years)
Jul 1st, 1986	1.09%	25¢
Jul 1st, 1987	1.04	24
Jan 1st, 1988	.61	14
Jan 1st, 1989	.98	24

These increases in pensions for pensions in payment were financed by utilization of a portion of the amounts already allocated to the Pension Adjustment Account (Retirement Account) and the Disability Account.

The financial effect of the amendments adopted as at January 1st, 1986 is summarized in the following table:

Change made in the pension formula to average of highest 6 years of earnings	$1,012,900
Decrease in the reduction applied to pension on retirement prior to age 60	62,900
Allocation to Disability Pension Adjustment Account	766,900
Total	$1,842,700

5. Experience of the Plan

The financial position of the Plan as at January 1st, 1989 is determined on the basis of a set of assumptions as to those factors which will affect the Plan financially in future years. The factors which are of financial significance to the Plan are:

(a) the rate of return assumed to be earned on the Fund,

(b) the rate at which salaries are assumed to increase,

(c) the rate at which interest is expected to be credited to employees' required contributions,

(d) the expenses of operating the Plan,

(e) the incidence of death after the date the pension commences,

(f) the incidence of death prior to the date the pension commences and the proportion of employees married,

(g) the incidence of termination of service, and the proportion of terminating employees who elect a paid-up pension,

(h) the incidence of disability, and

(i) the incidence of retirement prior to age 70.

Assumptions are developed in respect of each of these factors in order to determine:

(i) the amount of each benefit expected to be paid in each future year as a result of service completed up to the valuation date, on the basis of the Plan as it existed on that date, and

(ii) the present value of these expected benefits for the purposes of establishing the financial position of the Plan as at the valuation date.

Each assumption has been developed from the assumptions used in the 1986 Report unless otherwise noted. The rates of retirement prior to age 70 were developed from the rates utilized for the amendment made to the Plan which changed the reduction in pension on retirement prior to age 60 from 1/8 of 1% to 1/16 of 1%.

The assumptions can be divided into the following 2 general categories:

(a) those assumptions which are based on economic conditions or on factors which are not related to changes in status occurring among members of the Plan (economic assumptions), and

(b) those assumptions which indicate the expected utilization of benefits at each age in the future (utilization assumptions).

The economic assumptions consist of:

(a) the rate of return which is assumed to be earned on the Fund,

(b) the rates at which salaries are assumed to increase (due to inflation and productivity only),

(c) the rate at which interest is expected to be credited to employees' required contributions, and

(d) the expenses of operating the Plan.

The economic assumptions were reviewed for the most part by a study of the general economic experience during the 20-year period ending December 31st, 1988. The last complete study of such experience was made for the 1986 Report.

The experience concerning the utilization of benefits has been studied over the 3-year period ending December 31st, 1988 and the 9-year period ending December 31st, 1988. The experience prior to this time is not as useful in developing the rates since it does not reflect subsequent changes in the Plan and in the level of economic activity. The last complete study of such experience was made for the 1986 Report.

The number of deaths, terminations, disablements, and retirements which actually occurred during these periods were compared to the number expected to occur. The numbers expected to occur were calculated by using the rates of utilization assumed in the 1986 Report.

Any differences between the actual experience and the expectations based on the existing assumptions have been analyzed. Where appropriate, the assumptions previously used have been modified to reflect the results of this study of the experience.

(a) Rate of Return on the Assets of the Fund

The rates of return earned on the Fund each year during the last 6 years are shown in the following table:

Year Ending December 31st	Fixed Income Portion	Equity Portion	Total Fund
1983	12.67%	4.59%	11.69%
1984	11.79	4.67	10.47
1985	12.63	9.10	11.82
Average	12.36%	6.12%	11.33%
1986	12.26%	8.21%	11.30%
1987	11.70	6.62	10.49
1988	11.27	9.16	10.75
Average	11.74%	8.00%	10.85%

The fixed income portion of the Fund includes bonds, mortgages, and calendar year funds being managed by insurance companies and trust companies, short term notes and accrued interest, less the amount of the fixed income investment reserve.

The equity portion of the Fund includes common shares, units of pooled real estate funds and units of pooled equity funds.

The Fund consists of the fixed income portion, the equity portion and cash, plus any amounts receivable less any amounts payable as at December 31st of each year.

The rates of return on the fixed income portion of the Fund are based on the amortized cost of the fixed income investments less the amount of the fixed income investment reserve. Income on the fixed income investments each year is the interest earned plus amounts for amortization of discounts and premiums and realized gains or losses, less the amount credited to the fixed income investment reserve.

The rates of return on the equity portion of the Fund are based on the adjusted cost of the equity investments, as shown in the accounts of the Fund. Income on the equity investments each year consists of dividends, share of earnings, if applicable, plus amounts for unrealized appreciation or depreciation adjustments and amortization of realized gains or losses.

In the 1986 Reports, it was assumed that the rate of return would be 9.00% per year. The rates of return earned during 1986, 1987, and 1988 compare favourably with the assumed rate of return.

An actuarial valuation relates to events which are expected to happen in the future. As a result, the rates of return obtained in past years are important only to the extent that they constitute a good indication of the rates of return which can be expected to be earned in the future.

The rate of return which the Fund can be expected to earn in future years depends on the following factors:

(i) the rate of return being earned on the Fund as at the valuation date,

(ii) the rate of return expected to be earned on each category of investment in which amounts are expected to be invested in the future, and

(iii) the future policy of the Investment Committee for the Fund.

The rate of return assumed in an actuarial valuation should represent a reasonable balance between the rates of return currently being earned and the rates of return which can be expected to be earned on new investments which will be made in the future.

An indication of the rates of return likely to be available in future years can be obtained from a study of the rates which have been available over a period in the past. It is important that the period studied be long enough to include a variety of economic conditions. This is achieved by using a 20-year period. In this Report, we have used the 20-year period from January 1st, 1969 to December 31st, 1988.

A period as long as 20 years allows the effect of a variety of economic conditions to be reflected in the result obtained. It reduces the fluctuations and distortions which can occur, over shorter periods of time, due to business conditions and government controls.

We have determined the average of rates of return for fixed income investments during the 20-year period. These rates have been determined for each type of fixed income investment in which new investments have been made for the Fund. The results obtained are shown in the following table:

Investment Category	20-Year Average Rate of Return	Basis
Federal Bonds	10.06%	Long Term Federal Bonds
Provincial Bonds	10.81	M.Y.W. Provincial Bonds
Corporate Bonds	11.08	M.Y.W. Industrial and Utility Bonds
N.H.A. Mortgages	11.37	N.H.A. mortgage interest rates less 3/8 of 1% for servicing
Conventional Mortgages	11.60	Conventional mortgage interest rates less 3/8 of 1% for servicing

Similar results have not been provided for equity investments since, unlike fixed income investments, an equity investment is attractive only if there is an increase in the value of the investment during the term of the investment. Over long periods in the past, these increases in value have been sufficient to cause the rate of return obtained on equities to exceed the rate of return obtained on fixed income investments. In the last 20 years there have been significant fluctuations in the value of equity investments. As a result, the dates on which such investments are purchased and sold have an important influence on the results that are obtained.

It has been assumed that, in future, it will be possible to choose these dates with sufficient skill so that the rate of return obtained on equity investments is at least equal to the rate of return which could have been obtained on fixed income investments. As it is possible to allocate all of the Fund to fixed income investments, it is reasonable to assume that existing investments in equities will be retained, and new investments in equities will be made, only if such investments are expected to produce a higher rate of return than can be obtained on fixed income investments. Otherwise, investments in equities would not be justified.

The amounts invested in short term investments have been excluded from this tabulation. Such investments are used to produce income

for the Fund until it is appropriate to make more permanent investments. Use of this procedure helps to increase the rate of return earned by the Fund.

Over the 6-year period prior to the valuation date, the new fixed income investments of the Fund were distributed by category in the following proportions:

Investment Category	Proportion
Federal Bonds	18.64%
Provincial Bonds	8.11
Corporate Bonds	29.76
N.H.A. Mortgages	21.08
Conventional Mortgages	22.41
	100.00%

This information can be used to determine the rate of return which is expected to be obtained in future years if it is assumed that:

(i) the distribution of new fixed income investments by category over the 6-year period is a good representation of the investment policy which will be followed in the future,

(ii) the average rates of return obtained in the future on each category of fixed income investments will be at least as high as the average rate of return obtained during the 20-year period prior to the valuation date, and

(iii) any equity investments will produce at least as high a rate of return as fixed income investments.

A rate of return of 11.05% per year is produced by the use of this distribution of new fixed income investments and the 20-year average rate of return obtained on each category of new fixed income investments. This rate is reduced to 10.86% per year if allowance is made for investment management charges of .19 of 1% per year.

It is also desirable to make allowance for the possibility that the rates of return which are available in future will be less than the rates of return which were available during the latest 20-year period.

This allowance has been made by excluding from the calculation the very high rates of return that were available during 1981 and the first 6 months of 1982. If this is done, the 20-year average rate of return becomes 10.58% per year before allowance for investment management charges, and 10.39% per year after such allowance is made.

The rate assumed is also affected by the following considerations.

In recent years, the financial markets enabled investors to get favourable rates of return. The rates of return have been especially favourable for investments in bonds and mortgages. The differences between the rates of interest on new fixed income investments and the rates of inflation currently being experienced have been several times the differences available over longer periods of time in the past. In the past, such periods have been followed by periods when the rate of return has not been as favourable.

It is important to take into account the effect which a decrease in the rate of inflation will have on rates of return obtained in future. The need to make allowance for this possibility is greater when the rate of inflation currently being experienced is less than the rate of inflation experienced over the applicable parts of the 20-year period.

A decrease in the rate of return has an adverse effect on the financial position of the Fund. This adverse financial effect is experienced even if there is a corresponding reduction in the rate of inflation.

On the basis of the foregoing considerations, it is reasonable to expect that the Fund will earn a rate of return of at least 8.75% per year, on average, in the future.

The following table summarizes the adjustments made in determining the assumed rate of return:

Calculation based on 20-year averages and 6-year distribution of new fixed income investments	11.05%
Effect of removing 1981 and first 6 months of 1982 from 20-year averages	(.47)
Allowance for investment management charges	(.19)
Allowance for lower rates of inflation and less favorable rates of return in future	(1.64)
Assumed rate of return	8.75%

The assumed rate of return will be the same as the actual rate if there is no change in the distribution of new fixed income investments by category, and no gains or losses are realized on the sale of these investments. The same or better results would be achieved if any losses are more than offset by an increase in investment income.

A proportion of the assumed rate of return is attributable to the expectation that inflation will exist in the future. Inflation causes a decrease in purchasing power. Knowledgeable investors have sought to offset this decrease by charging rates of interest which, on average, make allowance for the expected rate of inflation during the term of the investment. This allowance is added to the real rate of return desired by the investor to produce the rate of interest charged on that investment.

This decrease in purchasing power can be measured by determining the average annual rate of increase in the Consumer Price Index for Canada (C.P.I.). During the 20 years ending December 31st, 1988, the C.P.I. increased by an average of 6.87% per year.

This increase is also affected by the elimination of the increases in the C.P.I. during 1981 and the first 6 months of 1982 from the period covered by the average. If that is done, the increase in the C.P.I. over the period is 6.44% per year.

Some allowance can be made for lower rates of inflation by using 6.25% per year as the assumed rate.

If the inflationary component in the assumed rate of return of 8.75% is 6.25%, the real rate of return is expected to be 2.50% per year. The real rate of return used in the 1986 Report was also equal to 2.50%.

There are 2 reasons for identifying the 2 parts of the rate of return. These are:

(i) to ensure consistency in the choice of economic assumptions. The assumed rate of return is based on an assumption as to future economic conditions. So also is the assumption made as to the rate at which salaries will increase in future years. Consequently, in order to ensure consistency, the same allowance for inflation, i.e. 6.25% per year, is used in developing both actuarial assumptions, and

(ii) to give a good indication of the rate of return required to be obtained. The assumption of a real rate of return of 2.50% per year implies that new investments obtained for the Fund are expected to yield a rate of return of at least 2.50% per year in excess of the average rate of inflation during the period that these investments are held.

(b) Rates of Salary Increase

Salary increases occur as a result of:

(i) general increases. These increases in salary are granted to all employees and reflect changes in economic conditions, and

(ii) service, merit and promotional increases. These increases in salary are granted on an individual basis to recognize an employee's service and increased value to the employer.

Each class of increase is considered separately in developing the rates at which salaries can be expected to increase in the future.

(i) General Increases

The 2 components of general increases in salaries are:

(A) the inflationary component. Employees seek increases in salary in order to offset any decreases in purchasing power which are caused by inflation, and

(B) the productivity component or increase in the standard of living component. The productivity component consists of that portion of general increases in salaries which are not offset by inflation. These increases are due to factors such as increases in the real value of goods and services produced per employed person. An increase in productivity is made possible by the greater use of automated or other equipment. Other increases can occur as a result of increases in the qualifications needed to fulfill a position.

The inflationary component of future increases in salaries should be the same as the inflationary component included in the rate of return assumed to be earned on the assets of the Fund in future years. As explained in the previous subsection of this Report, the period used requires the allowance made for inflation in the future to be at the rate of 6.25% per year.

The productivity component is based on a study of increases in the average salaries of employed persons in Canada during the 20-year period prior to December 31st, 1988. The productivity component is obtained by deducting the inflationary component from these increases in salaries. During this period, the productivity component was equal to 1.06% per year.

As a result, an allowance of 1.00% per year was made for the productivity component of general salary increases. This allowance is the same as the allowance which was made in the 1986 Report.

The expected general increases in salary are obtained by adding together the increases expected to occur in each component. On that basis, general increases in salary are expected to occur, on average, at a rate equal to 7.25% per year in future. This rate consists of an average expected productivity increase of 1.00% per year plus an allowance for future inflation at a rate of 6.25% per year.

(ii) Service, Merit and Promotional Increases

The following table shows, for each age group of employees, the rates of service, merit and promotional increases which have been adopted for use in this Report. Separate rates for male and female employees have been adopted as the experience of the Plan indicates that a statistically significant difference in salary patterns exists.

Ages	Males	Females
20 - 25	4.7%	3.3%
25 - 30	3.3	2.8
30 - 35	2.4	2.7
35 - 40	2.2	1.8
40 - 45	1.6	1.6
45 - 50	1.6	1.3
50 - 55	1.5	1.4
55 - 60	0.4	0.9
60 - 65	0.4	0.7
65 - 70	0.2	0.4

The following procedure was used to determine these rates:

The average salary received during the year ended December 31st, 1988 by employees in the same quinquennial age and length of service subdivision was compared with the average salaries of other groups of employees who, on average, are 5 years older with 5 more years of service, are 10 years older with 10 more years of service, are 15 years older with 15 more years of service, and so on. For this purpose, we excluded the salaries of those employees who are receiving more than twice as much or less than half as much salary as the average salary in that age and service group.

A comparison of the actual increases in salary to those expected was made. This comparison indicated that an adjustment should be made to the previously adopted rates of increases in salaries for males and females. The adjustment was made by reducing by 25% the difference between the actual percentage change in salaries and the expected percentage change for these 2 categories of employees.

(c) Rate at which Interest is Expected to be Credited to Employees' Required Contributions

A cash settlement can be paid to a terminating employee in respect of service for which the pension does not have to be protected. The cash settlement is equal to the employee's required contributions, with interest.

The benefit paid in respect of an employee who dies prior to retirement after the completion of 5 years of service has a value which is equal to the greater of 2 times the employee's contributions with interest or the commuted value of the pension. If the employee has not completed 5 years of service, the benefit paid is equal to 2 times the employee's contributions with interest.

It is anticipated that the rate of interest will be based on a 5-year moving average of the rates of interest credited to non-chequing savings accounts operated by the major chartered banks in Canada.

A good indication of the rates of interest likely to be credited in the future can be obtained from a study of the rates of interest which have been allowed on these non-chequing savings accounts during the 20-year period ending December 31st, 1988. During this period, the average rate of interest was 7.40% per year. If the rates of interest credited during 1981 and the first 6 months of 1982 are removed from the average, the average rate of interest is 6.82% per year.

On the basis of the above considerations, it is reasonable to anticipate that, in future, interest will be credited on required contributions at the rate of 6.50% per year.

(d) Cost of Operating the Plan

The expenses incurred in operating the Plan are deducted from the Fund.

The provision for investment management charges and related fees, such as mortgage servicing fees, is made separately through the choice of the assumed rate of return.

The actual administrative expenses incurred during 1986, 1987 and 1988 were 4.55% of the contributions received from the employees and employers during the same period. These expenses were incurred during a period in which many changes had to be made to reflect improvements in the Plan and in order to comply with pension reform. Some of these expenses are likely to be non-recurring. As a result, an allowance of 4.00% has been adopted for this Report.

These expenses are attributable to current service and to service which has already been completed. As a result, the following provisions have been made:

(i) Part of these expenses is provided for in the calculation of the contribution rate for current service. This allowance is equal to 2.00% of the required contributions for current service.

(ii) The other part of these expenses is provided for by making a provision for future expenses in the balance sheet. This allowance is the present value of the expenses assumed to be incurred in future which is attributable to service which has already been completed and is equal to $1,538,100.

The allowance made anticipates that the expenses of operating the Plan will increase with increases in earnings.

(e) Incidence of Death After the Date the Pension Commences

The study of mortality rates after pension commences differentiated between:

(i) employees who retired in at least average health,

(ii) employees who received a pension due to total disability, and

(iii) survivors of employees who died in service or while in receipt of a pension.

This separation makes it possible to recognize any differences in the rates of mortality which are due to the way in which the pension commenced.

The results of this study are shown in the following table:

		1986 - 1988		1980 - 1988	
		Actual	Expected	Actual	Expected
Males	- Non-disabled	13	13	28	23
	- Disabled	6	3	9	5
Females	- Non-disabled	1	1	2	2
		20	17	39	30

The actual number of deaths amongst non-disabled pensioners was equal to the number expected to occur during the 3-year period and greater than or equal to the number expected to occur during the 9-year period prior to the valuation date.

A study of the 9-year period indicates that rates of mortality have been decreasing. This trend has also occurred in most other plans. These rates of mortality were reduced in the 1986 Report. As a result, the rates of mortality applicable to non-disabled

pensioners adopted in the 1986 Report have been continued in use for this Report.

There is little experience available on disabled male pensioners and practically no experience available on disabled female pensioners. The rates of mortality presently in use for disabled pensioners have been found to be suitable for other plans where a significant amount of experience has been accumulated. As a result, no change was made to the rates of mortality applicable to pensioners who were disabled at the date the pension commenced.

There is no significant experience available on mortality amongst survivors who are receiving a pension. Normally, the mortality experience of survivors is similar to the mortality experience amongst pensioners of the same age and sex who were in at least average health at retirement. The rates of mortality adopted for survivors were made equal to the rates of mortality adopted for non-disabled pensioners in the 1986 Report. As a result, the rates of mortality applicable to survivors adopted in the 1986 Report have been continued in use for this Report.

(f) Incidence of Death Prior to the Date the Pension Commences and Proportion of Employees Married

(i) Leading to a Cash Settlement or Survivor's Pension.

The results of the study of the incidence of death prior to the date the pension commences are shown in the following table:

	1986 - 1988		1980 - 1988	
	Actual	Expected	Actual	Expected
Males	8	21	36	52
Females	0	2	3	5
	8	23	39	57

The actual number of deaths amongst males and females was less than the number expected to occur during both the 3-year period and 9-year period prior to the valuation date. These results are consistent with the observed trend of decreasing rates of mortality in other plans.

As a result, the rates of mortality prior to pension commencement were reduced. The reduction was made by adopting a new standard table of rates of mortality.

On the basis of these new rates of mortality, 37 male deaths and 4 female deaths, would have been expected to occur during the 9-year period prior to the valuation date.

(ii) Proportion Married.

If an employee dies after the completion of 5 years of service and is survived by a spouse or eligible dependent, the death benefit is paid as a pension. If there is no surviving spouse or eligible dependent, the death benefit is a cash settlement. The value of the death benefit is the same in both situations.

For the purpose of splitting the liabilities between survivor's pensions and cash settlements, at each age proportions of employees who have a spouse were adopted. The proportions adopted are based on a recent study of a large group of employees. These proportions have been found to be suitable for several other large groups of employees.

(g) Incidence of Termination of Service

(i) Leading to a Cash Settlement or a paid-up pension.

Each employee whose service terminates prior to retirement is entitled to receive either a cash settlement or a paid-up pension, or both.

The results of the study of the incidence of termination from service are shown in the following table:

	1986 - 1988		1980 - 1988	
	Actual	Expected	Actual	Expected
Males	233	157	719	423
Females	116	141	362	361
	349	298	1,081	784

The foregoing tabulations include all employees whose service terminated prior to retirement. More meaningful results can be obtained by excluding those employees whose service is not financially significant. A termination is considered to be financially significant if the terminating employee has completed at least 5 years of service or more than one-half of the average period of service which has been completed by employees of the same age.

The results of the study of the incidence of significant terminations from service are shown in the following table:

	1986 - 1988		1980 - 1988	
	Actual	Expected	Actual	Expected
Males	157	122	423	324
Females	73	106	245	274
	230	228	668	598

The actual number of terminations was close to the number expected to occur during the 3-year period and slightly greater than the number expected during the 9-year period prior to the valuation date. The more recent experience is expected to continue. As a result, no change was made to the rates of termination.

(ii) Proportion Electing a paid-up pension.

A study has been made of the decisions of those employees who were less than age 45 at the date of termination but were eligible to elect a paid-up pension.

The results of this study are shown in the following table:

	1986 - 1988		1980 - 1988	
	Actual	Expected	Actual	Expected
Males	40	17	57	27
Females	14	6	22	10
	54	23	79	37

The number of employees who terminated and elected a paid-up pension was greater than the number expected to occur during both the 3-year and the 9-year period prior to the valuation date. Most of this difference occurred in the recent 3-year period as a result of pension reform. This trend is expected to continue.

As a result, the proportions expected to elect a paid-up pension were increased. The increase was made so that it caused a 50% reduction in the difference between the actual number

and the expected number of terminating employees electing a paid-up pension during the 9-year period.

On the basis of these new proportions 42 male employees and 16 female employees would have been expected to elect a paid-up pension on termination at ages less than 45 during the 9-year period prior to the valuation date.

If an employee has reached age 45 and completed at least 10 years of service at the date of termination, a paid-up pension is provided in respect of service after July 1st, 1976. It has been assumed that each such employee who terminates in future will elect a paid-up pension in respect to service prior to July 1st, 1976.

Allowance is made to reflect the increases in paid-up pension expected to occur prior to the date of commencement of pension. These increases are intended to offset part of the future increases in the cost of living. This allowance is equal to 3.125% (50% x 6.25%) per year for each year during the deferral period.

(h) Incidence of Disability

The results of the study of the incidence of employees becoming disabled are shown in the following table:

	1986 - 1988		1980 - 1988	
	Actual	Expected	Actual	Expected
Males	25	17	47	43
Females	2	5	3	15
	27	22	50	58

The actual number of disablements amongst males was greater than the number expected to occur during both the 3-year period and 9-year period prior to the valuation date. Most of this difference occurred in the recent 3-year period.

The actual number of disablements is close to the number expected during the 9-year period prior to the valuation date. As a result, no change was made to the rates of disablement amongst males.

The actual number of disablements amongst females was less than the number expected to occur in both the 3-year and 9-year period prior to the valuation date.

As a result, the rates of disablement amongst females were reduced. The reduction was made so that it caused a 25% reduction in the difference between the actual number and expected number of female employees who became disabled during the 9-year period.

On the basis of these new rates of disablement 12 females would have been expected to become disabled during the 9-year period prior to the valuation date.

(i) Incidence of Retirement Prior to Age 70

The early retirement privilege was improved effective July 1st, 1987. The reduction applied to the amount of pension on retirement prior to age 60 was changed from 1/8 of 1% to 1/16 of 1% per month for each complete month between the date of retirement and the date of attainment of age 60.

The results of the study of the incidence of retirement prior to age 70 are shown in the following table:

	1986 - 1988		1980 - 1988	
	Actual	Expected	Actual	Expected
Males	94	80	208	178
Females	16	14	51	38
	110	94	259	216

The actual number of retirements was greater than the number expected in both the 3-year period and 9-year period prior to the valuation date. Similar results were reported in the 1986 Report.

The improvement in the early retirement privilege is expected to cause some increase in the number of retirements prior to age 60.

In view of these considerations, the rates of retirement were increased. The increase was made so that it caused a 50% reduction in the difference between the actual number of retirements and the number expected to occur at ages below 60 during the 9-year period prior to the valuation date.

On the basis of these new rates 190 male employees and 40 female employees would have been expected to retire prior to age 70 during the 9-year period prior to the valuation date.

6. Summary of Actuarial Assumptions Used in this Report

(a) Annual Rate of Return on the Assets of the Fund - 8.75% per year.

Annual Rate of Inflation - 6.25% per year.

(b) Annual Rates of Salary Increase (including an allowance of 7.25% per year for future general increases in salary levels):

Ages	Males	Females
20 - 25	12.3%	10.7%
25 - 30	10.8	10.2
30 - 35	9.9	10.1
35 - 40	9.6	9.1
40 - 45	8.9	9.0
45 - 50	9.0	8.7
50 - 55	8.9	8.7
55 - 60	7.7	8.3
60 - 65	7.7	8.0
65 - 70	7.5	7.7

It has been assumed the Yearly Maximum Pensionable Earnings under the Canada Pension Plan will increase at the same rate as the allowance for general increases in salary - 7.25% per year.

(c) Annual Rate of Interest Expected to be Credited to Employees' Required Contributions - 6.50% per year.

(d) Provision for Expenses of Operating the Plan:

(i) 2.00% of the contributions required to be made by the employees who are members and the Participating Municipalities each year for benefits in respect of current service.

(ii) a provision for future expenses equal to $1,538,100 has been made on the Valuation Balance Sheet for service completed to the valuation date.

(e) Annual Rates of Death After the Date the Pension Commences (for selected ages):

Attained	Non-Disabled		Disabled		Survivors	
Age	Males	Females	Males	Females	Widowers	Widows
20	N/A	N/A	.0882	.0478	.0004	.0002
30	N/A	N/A	.0851	.0454	.0006	.0003
40	N/A	N/A	.0756	.0403	.0012	.0007
50	N/A	N/A	.0674	.0359	.0039	.0016
60	.0092	.0042	.0713	.0380	.0092	.0042
70	.0275	.0124	.0971	.0518	.0275	.0124
80	.0741	.0429	.1749	.0933	.0741	.0429
90	.1663	.1118	.3473	.1852	.1663	.1118
100	.3192	.2952	1.0000	1.0000	.3192	.2952

(f) Annual Rates of Death Prior to the Date the Pension Commences:

(i) leading to a cash settlement or a survivor's pension (for selected ages):

Attained Age	Males	Females
20	.0004	.0003
25	.0005	.0004
30	.0007	.0004
35	.0012	.0006
40	.0020	.0010
45	.0030	.0014
50	.0055	.0021
55	.0088	.0032
60	.0131	.0051
65	.0170	.0080
69	.0204	.0109

(ii) proportion of employees with a spouse (for selected ages):

Attained Age	Males	Females
25	.525	.475
30	.700	.600
35	.750	.650
40	.800	.700
45	.850	.700
50	.900	.700
54	.900	.700

(g) Annual Rates of Termination of Service:

(i) leading to a cash settlement or a paid-up pension (for selected ages):

Attained Age	Males	Females
20	.109	.226
25	.081	.203
30	.057	.143
35	.042	.083
40	.028	.047
45	.020	.036
50	.011	.024
54	.007	.014

(ii) proportion of eligible terminations expected to elect a paid-up pension where such a pension may be elected (for selected ages):

Attained Age	Males	Females
25	.200	.126
30	.310	.250
35	.390	.380
40	.440	.490
45	.500	.605
50	.615	.727
54	.716	.822

It is expected that all employees terminating service at ages 45 and older, who have completed 10 or more years of service, will elect a paid-up pension in respect to all service.

Allowance is made to reflect the increases in paid-up pension expected to occur prior to the date of commencement of pension. These increases are intended to offset part of the future increases in the cost of living. This allowance is equal to 3.125% (50% x 6.25%) per year for each year during the deferral period.

(h) Annual Rates of Disability (for selected ages):

Attained Age	Males	Females
35	.001	.002
40	.002	.002
45	.002	.003
50	.003	.005
55	.007	.009
60	.011	.016
64	.027	.037

(i) Annual Rates of Retirement (for selected ages):

Attained Age	Males	Females
56	.022	.092
58	.019	.018
60	.041	.074
62	.067	.124
64	.119	.161
66	.370	.233
68	.175	.500
70	1.000	1.000

7. Valuation Results - Present Members of the Plan

The unit credit actuarial cost method of valuation has been used in this Report.

The objective of this method is to accumulate the funds to a level which together with interest earnings will be sufficient to finance the accrued benefits as at the valuation date without further contributions.

The financial position of the Plan is indicated by the relationship between:

(a) the present value of the funds available to finance the liabilities of the Plan as they fall due, and

(b) the present value of the liabilities which the Plan has in respect of the benefits promised.

The actuarial valuation is the process whereby this relationship is quantified.

The principal source of funds available to finance the liabilities is the Fund.

The present value of the liabilities of the Plan in respect of employees is determined separately for each benefit the Plan provides.

For each benefit, each active employee and each future year of service in the Plan, we determine:

(a) the probability of a benefit becoming payable at each future age based on the actuarial assumptions outlined in a prior section of this Report,

(b) a discount factor which makes allowance for the portion of the benefit which is expected to be financed by future investment earnings, and

(c) the amount of the expected benefit. The amount of the benefit expected to be paid is based on service completed prior to the valuation date. The amount of the salary-related benefits is based on the projected salaries immediately prior to the event causing the benefit to be paid.

The present value of the liabilities for each benefit for each employee is the sum of the products of these 3 components over all possible future years of service for that employee. The present value of the liabilities for each benefit is the sum of the present values obtained for all employees.

The present value of the liabilities of the Plan, in respect of pensioners and former employees entitled to a paid-up pension, is determined by a similar process, except that the amount of the benefit is based on the amount of pension being paid at the valuation date or the amount of pension expected to become payable in the future.

The Plan consists of 2 main parts. These parts are the Pension Part of the Plan and the Disability Part of the Plan. The Disability Part of the Plan is responsible for any portion of each disability pension which is in excess of the accrued pension at the date of disability. This Part of the Plan is also responsible for certain cash settlements. If the service of an employee terminates and a cash settlement is paid under the Pension Part of the Plan, a cash settlement is also paid under the Disability Part of the Plan. If an employee dies prior to retirement and a cash settlement is paid under the Pension Part of the Plan, a cash settlement is also paid under the Disability Part of the Plan.

In a subsequent report, a balance sheet will be provided for each of these parts of the Plan.

The effect on the financial position of the Plan with respect to the benefits expected to be accrued for service after the valuation date is considered separately in a later section of this Report.

The Valuation Balance Sheet reflects the financial position of the Plan in respect of the benefits accrued for service up to the valuation date by present members.

Manitoba Municipal Employees' Pension Plan
Valuation Balance Sheet
as at January 1st, 1989

ASSETS

Invested Assets:		
Fixed Income (amortized cost - Note 1)	$49,637,562	
Equity (adjusted cost - Note 1)	12,142,103	
Investment Reserve	(643,566)	
Money Purchase Accounts Plan	(34,406)	
Pension Adjustment Account	(3,679,373)	
Long Term Disability Pension Adjustment Account	(1,018,669)	$56,403,651
Cash in bank	$ 8,332	
Accrued interest on investments	537,820	
Contributions receivable	519,720	
Computer Equipment	12,677	1,078,549
Value of future payments by employees purchasing credit for prior service		43,400
TOTAL ASSETS		$57,525,600

LIABILITIES

Value of liabilities in respect of current benefits		
- retirement pensions	$ 7,751,400	
- disability pensions	1,349,400	
- survivors' pensions	741,900	$ 9,842,700
Value of liabilities in respect of future benefits earned for service to December 31st, 1988		
(a) present employees		
- retirement pensions	$28,188,800	
- disability pensions	2,966,800	
- survivors' pensions	4,085,500	
- paid-up pensions	3,681,700	
- cash settlements on death	551,700	
- cash settlements on termination	471,200	
- refunds due to 50% test	1,238,400	
(b) former employees		
- paid-up pensions	664,300	41,848,400
Value of funds to be transferred under reciprocal agreements		15,900
Value of paid-up pensions to be paid under reciprocal agreements		1,171,600
Accounts payable (Note 2)		182,815
Provision for expenses of operating the Plan (Note 3)		1,538,100
TOTAL LIABILITIES		$54,599,515
SURPLUS		$2,926,085

Notes

1. Fixed income investments:

   Premiums and discounts greater than 1% of par value are amortized over the remaining term to maturity. In addition, gains and losses on disposition prior to maturity are amortized over the remaining term to maturity to a maximum of 20 years.

   Equity investments:

   Equity investments are adjusted annually to recognize 1/5 of unrealized appreciation or depreciation. In addition, gains or losses on disposition are amortized over 5 years.

2. Accounts payable:

   This item consists of:

- Accounts payable	$23,315
- Liabilities for cash settlements and other benefits in process	159,500
Total	$182,815

3. The provision for future expenses of operating the Plan represents the present value of a part of the expenses assumed to be incurred in the future for service completed up to the valuation date. The other part of these expenses is reflected in the calculation of the contribution rate for current service.

8. Analysis of Valuation Results

The results have been analyzed for the Valuation Balance Sheet prepared by using the service to date method.

This Valuation Balance Sheet discloses a surplus of $2,926,085 as at January 1st, 1989. In our 1986 Report, a surplus of $2,445,523 was disclosed.

The financial position of the Plan as at January 1st, 1989 can be reproduced if the surplus as at January 1st, 1986 is adjusted to recognize the various changes in the financial position which occurred during the valuation period. This procedure is demonstrated in the following schedule:

Surplus as at January 1st, 1986	$ 2,445,523
Cost of amendments	(1,842,700)
Interest at 9.00% on balance remaining	177,800
Expected surplus as at January 1st, 1989 before allowance for actual experience during the period under review and changes in expected future experience	$ 780,623
Effect of actual experience during period under review	6,970,062
Surplus as at January 1st, 1989 before allowance for changes in expected future experience	$ 7,750,685
Effect of changes in expected future experience	(4,824,600)
Surplus as at January 1st, 1989	$ 2,926,085

The following factors influenced the actual experience during the period under review and improved the financial results:

(a) The greater than assumed rate of return on investments made for the Plan. The improvement in financial position due to this source is equal to $2,716,200.

(b) The smaller than expected increases in salaries. The improvement in financial position due to this source is equal to $4,817,100.

(c) The smaller than expected number of deaths prior to retirement.

(d) The smaller than expected number of disablements amongst females.

The following factors influenced the actual experience during the period under review and had an adverse effect on the financial results:

(a) The greater than expected expenses of operating the Plan.

(b) The greater than expected number of retirements prior to age 70.

The following changes made to the actuarial assumptions improved the financial results:

(a) The decrease in the rates of salary increases.

(b) The decrease in the rates of disability amongst female employees.

The following changes made to the actuarial assumptions had an adverse effect on the financial results:

(a) The decrease in the rate of return assumed to be earned on the Fund in the future.

(b) The increase in the provision for the expenses of operating the Plan.

(c) The decrease in the rates of mortality applicable prior to commencement of pension.

(d) The increase in the proportion of terminations where a paid-up pension is expected to be elected for all employees.

(e) The increase in the rates of retirement prior to age 70.

The net adverse effect on the financial position due to the changes made to the actuarial assumptions was equal to $4,824,600.

9. Contribution Rate

As indicated earlier, the unit credit actuarial cost method of valuation has been used in this Report.

Under this method, the current service cost is the amount needed to finance the benefits accruing under the Plan in respect of service during the year. This amount is expressed as the percentage of salary received in that year. These rates are commonly called the theoretical contribution rates.

The adequacy of the contribution rates is determined by comparing:

(a) the required contribution rates, and

(b) the theoretical contribution rates.

The required contribution rates are as follows:

	Percentage of Earnings		
Pension Part of Plan	Employees	Participating Municipality	Total
≤Y.M.P.E.*	4.40%	4.40%	8.80%
>Y.M.P.E.*	6.00	6.00	12.00
Disability Part of Plan			
Municipality and employee both contribute**	.50%	.50%	1.00%
Municipality only contributes	-	1.00	1.00
Employee only contributes	1.00	-	1.00

*The Y.M.P.E. is the Yearly Maximum Pensionable Earnings under the Canada Pension Plan (C.P.P.).

**Four of the Participating Municipalities which share in the cost of the disability benefits pay less than 50% of the total rate of contribution.

The theoretical contribution rates are based on:

(a) the benefits and eligibility requirements which existed as at the valuation date,

(b) the distribution of the employees by age, sex, service, and earnings as at the valuation date, and

(c) the actuarial assumptions adopted for this Report.

The rates of contribution required to be made by the employees and the Participating Municipalities have been compared to the theoretical rates. This comparison is shown in the following table:

	Required Rates	Theoretical Rates	Margin
- on C.P.P. portion of earnings	9.80%	9.47%	.33%
- on portion of earnings in excess of C.P.P. earnings	13.00	12.57	.43

The above table indicates there is a margin in the present rates of contribution. The presence of this margin provides protection against possible future increases in the cost of benefits promised under the Plan.

The cost of benefits is affected by the distribution of the participating employees by age, sex, service, and earnings. If the average age of the participating employees increases, the cost of benefits can be expected to increase.

If the distribution of participating employees remains relatively unchanged, the cost of benefits can be expected to remain unchanged as a percentage of earnings.

10. Comments and Recommendations

During the last 3 years the financial position of the Plan has been improved by favourable experience.

A portion of these gains have been used to help finance changes in expected future experience.

Improvements have been made to the Plan during the period under review. These improvements have been reflected in the financial results.

In the past, a portion of the surplus has been allocated to the Pension Adjustment Accounts. Such allocations make it possible to continue to increase pensions in response to increases in the cost of living after the pensions commence. Further allocations do not appear to be necessary at this time.

The surplus may be used in any way considered desirable.

11. Certification

In our opinion, for the purposes of this Report:

(a) the data on which this Report is based is sufficient and reliable,

(b) the assumptions which have been used in this Report are adequate and appropriate, and

(c) the methods employed in this Report are consistent with sound actuarial principles.

This Report has been prepared and this opinion has been given in accordance with generally accepted actuarial principles and the Recommendations of the Canadian Institute of Actuaries.

We hereby certify that, in our opinion, the assets of the Plan are sufficient to provide the benefits promised under the Plan in respect of service completed to January 1st, 1989.

We will be pleased to discuss this Report with you at your convenience.

DATED at Winnipeg, this 24th day of November, 1989.

Respectfully submitted,

Dennis E Clement

Actuary

John A Turnbull

Actuary

COST CERTIFICATE
FOR THE
MANITOBA MUNICIPAL EMPLOYEES
PENSION PLAN
AS AT JANUARY 1ST, 1989

The undersigned hereby certifies that:

1. The fiscal year of the Manitoba Municipal Employees Pension Plan (Plan) is from January 1st to December 31st.

2. The actuarial cost method used to determine the estimated cost of benefits for service in 1989 is the service to date method (unit credit actuarial cost method). A salary projection was used with this method.

   The combined rates of contribution required to be made by the employees and the Participating Municipalities on their behalf in respect of current service are equal to 9.80% on the C.P.P. portion of earnings and 13.00% on the portion of earnings in excess of C.P.P. earnings.

   On the basis of the membership of the Plan as at January 1st, 1989, the estimated cost of benefits for service during 1989 is less than the amounts required to be contributed to the Plan as a result of such service.

   The estimated cost of benefits is equal to $5,803,800 for service in 1989.

3. The rule for computing the estimated cost of benefits for service in subsequent years up to the date of the next cost certificate is the same as in 2 above.

4. There are no initial unfunded liabilities or experience deficiencies under the Plan as at January 1st, 1989.

5. The Plan had a surplus equal to $2,926,085 as at January 1st, 1989.

SIGNED at Winnipeg, this 24th day of November, 1989.

Dennis E. Clement
Fellow, Canadian Institute of Actuaries

BASIS:

See Report